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April 30, 2015

Stephanie Vaughn
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Via Electronic Delivery

**Re: Draft Lower Passaic River Study Area (LPRSA) Draft Feasibility Study – May 2007
Administrative Agreement and Order on Consent for Remedial
Investigation/Feasibility Study – CERCLA Docket No. 02-2007-2009 (AOC)**

Dear Ms. Vaughn:

The LPRSA Cooperating Parties Group (CPG) is submitting the draft Feasibility Study (FS) for the 17-mile LPRSA Remedial Investigation/Feasibility Study (RI/FS) to U.S. Environmental Protection Agency (EPA) Region 2. The 17-mile Draft FS has been prepared pursuant to Section IX, paragraph 37.m of the above AOC. The Draft 17-mile FS follows the delivery of the Draft RI report to EPA on February 18, 2015.

Sampling conducted by the CPG under Region 2 oversight and direction, as part of the 17-mile RI/FS has generated over 12,000 samples and 2,500,000 individual contaminant measurements since 2004. Most of these data have been collected since May 2007 when the CPG assumed responsibility under Region 2 oversight for completing the 17-mile RI/FS. Current costs incurred by the CPG for the 17-mile RI/FS are approximately \$130 million.

The 17-mile FS utilizes and considers all of the data collected as part of the LPRSA RI/FS and represents the only complete and comprehensive evaluation of the LPRSA RI data.

The CPG is confident that the draft 17-mile FS provides the information needed to develop effective remedial alternatives and looks forward to working with EPA to develop a technically sound solution for the river. Thus, and for the reasons previously discussed in the CPG's August 2014 written comments on the 8-mile Proposed Plan, the CPG again reiterates that the RI/FS process for the entire 17-mile LPRSA should be considered pursuant to the National Contingency Plan (NCP) and used as the appropriate basis for Region 2's decision-making process for issuance of the Record of Decision for the entire LPRSA and not the April 2014 8-mile Proposed Plan.

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I. ALTERNATIVES EVALUATED

Four alternatives are identified and evaluated in the 17-mile Draft FS:

- Alternative 1 - No further action (RM 0 to 17.4). As required by the NCP, the no-action alternative is included and compared to other alternatives.
- Alternative 2 - Targeted dredge and cap, monitored natural recovery (MNR), and adaptive management (RM 0 to 17.4), with interim exposure reduction measures.
- Alternative 3 - Bank-to-bank dredge and cap for RM 0 to 8.3, including reestablishment of the navigation channel from RM 0 to 2.2 (Region 2 focused feasibility study [FFS] Alternative 3), and MNR for RM 8.3 to 17.4.
- Alternative 4 - Bank-to-bank dredge and cap for RM 0 to 8.3, including reestablishment of the navigation channel from RM 0 to 2.2 (Region 2 FFS Alternative 3), targeted upstream dredge and cap for RM 8.3 to 17.4, and MNR.

Each of the active alternatives (Alternatives 2, 3, and 4) considers two dredged material management (DMM) scenarios which were also evaluated in the Region 2 8-mile FFS:

- DMM Scenario A - transport of dredged sediment via barge to an upland sediment processing facility for dewatering and treatment, followed by off-site disposal of dredged sediment in one or more Subtitle C landfills located out of the state of New Jersey.
- DMM Scenario B - dredged sediment transported via barge for disposal in a confined aquatic disposal (CAD) facility to be constructed in Newark Bay.

II. IDENTIFICATION OF A RECOMMENDED ALTERNATIVE

Overall, the 17-mile FS Alternative 2 is the recommended alternative because it is protective of human health and the environment and complies with applicable or relevant and appropriate requirements (ARARs) with waivers, achieves equal or greater benefits relative to other alternatives more rapidly and cost-effectively, and with fewer adverse short-term impacts to workers, the community, and the environment. Targeted remedial efforts focus on addressing the most contaminated areas of the entire 17-mile LPRSA, which, combined with exposure reduction measures during and after the cleanup, reduce risks much faster than either Alternative 3 or 4.

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The evaluation of remedial costs and selection of a final remedy must consider the statutory requirements of the NCP, which states:

"Each remedial action selected shall be cost-effective, provided that it first satisfies the threshold criteria set forth in 40 Code of Federal Regulations (CFR) § 300.430(f)(1)(ii)(A) and (B)"; a remedy is deemed cost-effective "if its costs are proportional to its overall effectiveness" (Code of Federal Regulations [CFR]: 40 CFR §300.430(f)(1)(ii)(D)).

In summary, Alternative 2 meets the CERCLA protectiveness threshold criterion by providing greater risk reduction sooner than the other alternatives and at a fraction of the cost. Consistent with the requirements of the NCP, Alternative 2 is the recommended remedial alternative for the entire 17.4 miles of the LPRSA.

III. KEY FINDINGS OF THE 17-MILE FS EVALUATION AND COMPARISON OF ALTERNATIVES

The analysis of alternatives presented in the 17-mile FS reflects the scope and complexity of the LPRSA, and considers the relative significance of the factors within each criterion for each of the four alternatives. The nine CERCLA criteria are part of the NCP (40 CFR 300.430(e)(9)).

Threshold Criteria - To be eligible for selection as EPA's preferred alternative each alternative must meet two threshold criteria—overall protection of human health and the environment and compliance with ARARs that are not waived.

Overall protection of human health and the environment – Alternative 2 addresses the highest near surface concentrations of the primary risk driver 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and co-located total polychlorinated biphenyls (PCBs) in a significantly shorter time frame. Human health risks from the consumption of fish tissue are reduced to within acceptable risk levels EPA's target excess cancer risk range of 1×10^{-4} to 1×10^{-6} sooner (within 10 years) by Alternative 2 than by Alternative 4 (27 years). Alternative 3 is not expected to provide overall protection of human health for the entire 17.4-mile LPRSA.

Alternative 2 is also expected to be protective of ecological receptors in the entire LPRSA. Specifically, surficial sediment 2,3,7,8-TCDD surface weighted average concentrations (SWACs) are projected to be below the ecological sediment preliminary remediation goal (PRG), and projected fish tissue concentrations of

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total PCBs are estimated to be below the applicable PRGs following remedy implementation. A key-finding of the 17-mile RI in this regard is that benthic community impairment shows little correlation with sediment contaminant levels, and, with few exceptions, is not greater than observed at background locations. A second key-finding is non-chemical characteristics such as organic carbon, salinity, and sediment grain size contribute significantly to impairment of the benthic community unrelated to the presence or absence of chemical contaminants.

Alternative 1 does not meet the threshold criteria of protection of human health and the environment and is not evaluated further in the comparative analysis. Alternative 3 is retained in the comparative analysis to provide a broader range of alternatives.

Compliance with ARARs – None of the alternatives including Alternatives 2 and 4 will comply with all ARARs and all would require ARAR waivers to meet this threshold criteria.

Primary Balancing Criteria -

Long-term effectiveness and permanence – Both Alternatives 2 and 4 are effective and roughly equivalent in terms of long-term risk reduction. Alternative 3 results in less long-term effectiveness due to the fact that sediment in the upper 9 miles of the LPRSA is not actively addressed.

Reduction of toxicity, mobility or volume – Alternatives 2 and 4 are effective and roughly equivalent in reducing the toxicity, mobility and volume of contaminants of concern (COCs) that are adversely impacting human health and environment. Alternative 3 provides less reduction due to the fact that sediment in the upper 9 miles of the LPRSA is not actively addressed. Alternative 2 targets areas of surficial sediment that have relatively high contaminant concentrations, addresses the top few centimeters where most biological activity occurs, and are inhibiting the overall recovery of the river. Alternative 2 will provide the most rapid risk reduction and accelerate the recovery of the river while limiting impacts to the river's ecology and surrounding communities.

Short-term effectiveness - Alternative 2 has greater short-term effectiveness than Alternatives 3 and 4 when evaluated and compared based on the impacts on human health and the environment during active remediation. These impacts are proportional to the construction duration and volume of dredged material under

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each alternative. These "short-term" impacts will continue for a relatively short period (7 years) under Alternative 2, but for significantly longer periods under Alternatives 3 and 4 (24 and 27 years, respectively). Alternatives 3 and 4, which emphasize bank-to-bank sediment removal and have the longest construction durations, will consequently have greater short-term impacts in all respects than Alternative 2, which relies on a targeted approach to rapidly reduce risk and minimize disruption of the river and surrounding communities.

Implementability – Alternatives 3 and 4 have significantly greater and more complicated technical and administrative implementability issues than Alternative 2 due to their much larger geographic extent within the river, longer duration and the increased complexity of dredging and DMM associated with larger sediment removal volumes and footprints. Alternatives 3 and 4 involve significantly larger removal and cap material volumes, require two to three times as many bridge openings, barge and truck trips, and rail use as Alternative 2. Alternatives 3 and 4 also impose considerably greater challenges and limitations associated with implementing dredging and capping around utility crossings, bridges, and shoreline structures; thus Alternatives 3 and 4 have a comparatively greater potential for problems and delays than does Alternative 2, which has a more focused active footprint, lower removal volumes, and a shorter construction period.

Cost - For off-site disposal (DMM Scenario A), Alternative 2 has an estimated cost of \$726 million (714,000 cubic yard removal volume) while Alternative 4 (4,496,000 cubic yard removal volume) is estimated to cost \$2,652 million. For disposal in a Newark Bay CAD (DMM Scenario B), while remedial costs are largely driven by dredge volume, dredge material management costs are significantly less due to the elimination of material processing, off-site transportation, and disposal. Selection of the CAD option would reduce the overall costs of Alternatives 2 and 4 by \$243 million and \$1,100 million, respectively. Thus, the estimated cost of Alternative 2 with DMM Scenario B is \$483 million and the estimated costs for Alternative 4 with DMM Scenario B is \$1,552 million.

Modifying Criteria - The modifying criteria are assessed by EPA, subsequent to the feasibility study, based on consideration of state and public comment on EPA's proposed plan for remedial action. However, the following is currently known based on the States' and Communities' responses to Region 2's preferred alternative identified in the 8-mile Proposed Plan.

State acceptance – New Jersey has expressed support in the past for a remedial solution similar to Alternatives 3 and 4 with off-site disposal. However, an objective

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re-evaluation of the remedial alternatives and dredged material management scenarios for the entire LPRSA presented in the 17-mile FS should alter this view.

Community acceptance – More than two dozen local municipalities and private and public organizations have voiced significant concerns regarding the 8-mile Proposed Plan bank-to-bank dredging alternative similar to Alternatives 3 and 4; this includes municipal, county and state elected and appointed officials. Nearly 200 individuals have also indicated either concern or opposition to a bank-to-bank alternative.

Currently, public support does not clearly indicate strong support for a bank-to-bank remedial alternative (similar to Alternatives 3 and 4) as proposed in the 8-mile Proposed Plan. Public issues with any of the proposed alternatives include duration, disruption of the public's use of the river and regional infrastructure, local siting of facilities, adverse redevelopment and economic impacts. Alternative 2 ameliorates some of the public concerns by minimizing adverse impacts (duration and disruption) as well as by providing additional active interim efforts to reduce risk until risk management objectives are achieved (e.g., fish exchange, carp management), Alternatives 3 and 4 would likely result in significant long-term disruptions to the region and its economy.

IV. OTHER SIGNIFICANT CONSIDERATIONS

Adaptive Management - Given the unprecedented complexity of the LPRSA, sediment remediation within the LPRSA will involve significant uncertainties with respect to technical implementation, construction time frames, cost, and the effectiveness of the remediation in promoting recovery of the system to reduce risk to human health and the environment. Thus, the application of adaptive management as a component of the 17-mile remedial action is appropriate and consistent with EPA guidance. As stated in EPA's 2002 guidance, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*, Sediment Management Principle 5:

"EPA encourages the use of an iterative approach, especially at complex contaminated sediment sites. As used here, an iterative approach is defined broadly to include approaches which incorporate testing of hypotheses and conclusions and foster re-evaluation of site assumptions as new information is gathered."

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Adaptive management is a phased remediation approach that:

- Allows for an iterative and ongoing evaluation of progress toward remedial goals;
- Recognizes project-related uncertainties and risks of implementing a large remedy such as the entire 17-mile LPRSA (including the limitations of accurately predicting recovery); and
- Can actively respond to new information and conditions during the remedial process.

This systematic remedial approach promotes the efficient use of resources and reduces, or potentially avoids short-term impacts on surrounding communities. Adaptive management can assure the success of remedial actions, since progress is routinely assessed by comparing remedy performance with performance goals, allowing for actions to be adjusted, when needed, to address up-to-date environmental conditions.

Remediation of the LPRSA has all the characteristics described above which makes it an ideal candidate for adaptive management. Alternative 2 includes provisions for adaptive management and post-remediation monitoring to re-evaluate the remedy in the event that risk reduction targets are not achieved. Alternatives 3 and 4 are primarily based on the preferred alternative identified in the Region 2's 8-mile FFS and do not include adaptive management. If Alternatives 3 or 4 fail to achieve risk reduction goals, nothing will have been learned to inform future actions.

Background - The primary human health risk driver is 2,3,7,8-TCDD. A lesser secondary contributor to risk is total PCBs, although its presence in the LPRSA is attributable in part to background contributions. Contribution to risk from other compounds, including several pesticides, PAHs, and metals, are relatively minor and comparable to background. Average background sediment concentrations of 2,3,7,8 -TCDD above Dundee Dam (Upper Passaic River) are in the low part per trillion levels which are on the order of two or more orders of magnitude lower than average concentrations found in LPRSA sediment. Thus, the remediation of the LPRSA sediment in the absence of upstream/downstream source control has the potential to significantly reduce the levels of 2,3,7,8-TCDD, but less potential to reduce the average levels of the other contaminants over the long term due to recontamination from the Upper Passaic River above Dundee Dam and Newark Bay.

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The 17-mile LPRSA Baseline Human Health Risk Assessment (BHHRA) identified a background concentration with an upper range of 0.80 mg/kg for total PCBs in sediments above Dundee Dam, after removal of an outlier of 5.11 mg/kg. Upper Passaic River total PCB concentrations are characterized in the 8-mile FFS (Appendix A, Data Evaluation Report 2) as ranging from 0.22 to 1.5 mg/kg, averaging approximately 0.5 mg/kg, with little change since 1990. Region 2's FFS HHRA presents an average background concentration of 0.46 mg/kg for non-dioxin-like PCBs. Despite the elevated background concentrations for total PCBs that both Region 2 and CPG have found as part of the 17-mile LPRSA RI/FS, Region 2 has selected a total PCB sediment PRG (0.044 mg/kg) in its 8-mile Proposed Plan that is at least an order of magnitude lower than the "average" background concentrations, and inconsistent with EPA's own guidance on addressing background concentrations. The data collected in the RI/FS demonstrate that the sediment PRG selected by Region 2 is unachievable.

Uncertainty and Conservatism - The draft BHHRA and Ecological Risk Assessment (ERA) were prepared consistent with Region 2 directives. The BHHRA uses extremely conservative assumptions that were selected by Region 2. Many of these assumptions for exposure parameters rely on upper bound values. For an adult angler, it has been assumed that he or she would eat as many as 56 fish meals per year, that fish consumption would continue for 30 years, that all of the fish consumed would be from the LPRSA, and that there would be no loss of contaminants during cooking. The CPG's 2011-2012 Creel Angler Survey, conducted over a one year period throughout the entire 17-mile LPRSA, did not find any individuals who fit the profile mandated by Region 2 assumptions. Thus, when all of the Region 2-directed conservative assumptions are compounded, human health risks are, by definition, overestimated. Actual exposures based on a thorough understanding of site-specific conditions are likely much lower than the risk estimate represented in the BHHRA. Using assumptions that are reasonably conservative and more accurately reflect site-specific conditions yields risks approximately ten-fold lower than those presented in the BHHRA.¹

Navigational Dredging - The navigational dredging incorporated into Alternatives 3 and 4 of the 17-mile FS (for consistency with the 8-mile Proposed Plan preferred alternative) is not a CERCLA response action because it does not address risk to human health and the environment. Alternatives 3 and 4 both include a large volume of sediment removal in the lower eight miles of the river. Almost half of that volume is for navigational dredging that does not directly address protection of

¹ See AECOM's August 2014 site-specific human health risk assessment of the LPRSA, which was provided to EPA as an attachment the CPG's February 18, 2015, transmittal of the draft remedial investigation report.

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human health and the environment. The cost for removing this additional volume is estimated at \$850 million for Alternatives 3 and 4. The USACE has not performed a cost-benefit analysis for reestablishment of the navigation channel in the LPRSA which would be required for consideration of congressional funding for federal projects under the Water Resources Development Act. In summary, while navigational dredging is included in 17-mile FS Alternatives 3 and 4 for consistency with Region 2's 8-mile FFS and Proposed Plan, it neither contributes to risk reduction, nor has its value to address navigational needs in the LPR been adequately evaluated.

Newark Bay CAD - The New York District Commander, US Army Corps of Engineers (USACE) states in his November 30, 2012 letter to EPA's National Remedy Review Board that CAD cells can be constructed and utilized with only localized short-term impacts and with the least impacts to the surrounding communities. CAD cells have been constructed and used all over the country including in Newark Bay with the construction, use and recent capping of the Newark Bay Confined Disposal Facility. The USACE has concluded that conditions in Newark Bay are favorable for the construction and safe use of a CAD, ensuring the long-term secure and consolidated disposal of contaminated sediment. Region 2 also included a CAD in Newark Bay as an alternative dredge management method in its 8-mile Proposed Plan. Consideration and selection of this alternative dredge management method should be based on sound technical rationale and cost-effectiveness evaluations.

V. CONCLUSIONS

Alternative 2 of the draft 17-mile FS provides the following benefits when compared to Alternatives 3 and 4:

- A more focused, responsive remedy that immediately addresses risk through targeted removal;
- Faster implementation with fewer impacts and impediments;
- An Adaptive Management component to manage uncertainty, and provide more flexibility and response during construction and post-construction monitoring;
- Greater overall protection of human health and ecological risk;
- Earlier risk reduction than either Alternatives 3 or 4; and
- Cost Effectiveness – better risk reduction at approximately 25% of the estimated cost of Alternatives 3 and 4.

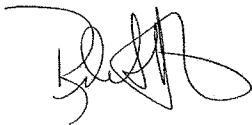
Targeted Dredge and Cap with MNR and Risk Reduction Measures (Alternative 2) is the recommended alternative identified in the draft 17-mile FS for the entire LPRSA.

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The CPG requests that Region 2 include this transmittal letter and the complete draft 17-mile FS and its appendices into the Administrative Record for the 17-mile LPRSA operable unit of the Diamond Alkali Superfund Site.

Please contact Bill Potter or me with any questions.

Very Truly Yours,
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